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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/575,853

04/14/2006

Masato Yamada

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ALEXANDRIA, VA 22320-4850

EXAMINER

WILSON, SCOTT R

ART UNIT

PAPER NUMBER

2826

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/575,853	YAMADA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	SCOTT R. WILSON	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 10 is/are rejected.
- 7) ☒ Claim(s) 6-9 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/14/06, 3/30/07</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Shakuda et al. (US 6,107,648 A). As to claim 1, Shakuda et al., Figure 1(a), discloses a light emitting device comprising: a light emitting layer portion (11)(col. 5, lines 30-32) composed of a III-V compound semiconductor; and a transparent thick-film semiconductor layer (7) having a thickness of 10  $\mu\text{m}$  or more (col. 6, line 60), formed on at least one main surface of the light emitting layer portion, and composed of a III-V compound semiconductor, embodied as GaP, having a band gap energy larger than a light quantum energy equivalent to a peak wavelength of emission flux from the light emitting layer portion (col. 7, lines 25-26), the transparent thick-film semiconductor layer has the side face portions (col. 9, lines 50-52) configured as chemically-etched surfaces, and has a doping-controlled region having a controlled dopant concentration of  $5 \times 10^{16}/\text{cm}^3$  to  $2 \times 10^{18}/\text{cm}^3$ , both ends inclusive (col. 6, lines 59-60), formed therein to a thickness of 10  $\mu\text{m}$  or more.

As to claim 3, Shakuda et al., Figure 1(a), discloses that the light emitting layer portion (11), considered as having one of two main surfaces thereof as a first main surface, has a main light extraction surface (3) formed on the first main surface side thereof, a light-extraction-surface-side metal electrode (9) is disposed on the main light extraction surface so as to cover a part of thereof, and on the other hand, the transparent thick-film semiconductor layer (7) is provided only on the second main surface side of the light emitting layer portion.

As to claim 4, Shakuda et al., Figure 1(a), discloses that the transparent thick film semiconductor layer (7) is disposed on the first main surface side of the light emitting layer portion (11), and assuming

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the first main surface of the transparent-thick-film semiconductor layer as the main light extraction surface, the light-extraction-surface-side metal electrode (8) is disposed so as to cover a part thereof.

As to claim 5, Shakuda et al., Figure 1(a), discloses that a metal reflective layer (9) is disposed on the second main surface side of the light emitting layer portion.

Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Shakuda et al.. Shakuda et al., Figure 1(a), discloses a method of fabricating a light emitting device comprising: fabricating a wafer which comprises a light emitting layer portion (11)(col. 5, lines 30-32) composed of a III-V compound semiconductor; and a transparent thick-film semiconductor layer (7) having a thickness of 10 pm or more (col. 6, line 60), formed on at least one main surface of the light emitting layer portion, and composed of a III-V compound semiconductor, embodied as GaP, having a band gap energy larger than a light quantum energy equivalent to a peak wavelength of emission flux from the light emitting layer portion (col. 7, lines 25-26); and dicing the wafer to divide it into the individual device chips; also forming, in the transparent thick-film semiconductor layer, a doping-controlled region having a controlled dopant concentration of  $5 \times 10^{16}/\text{cm}^3$  to  $2 \times 10^{18}/\text{cm}^3$ , both ends inclusive (col. 6, lines 59-60), to a thickness of 10 pm or more, and removing a process-damaged layer, formed on the side face portions of the transparent thick-film semiconductor layer, by chemical etching after the dicing.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shakuda et al. in view of Huang et al.. Shakuda et al., Figure 1(a), discloses the device of claim 1, as described above. Shakuda et al. does not disclose expressly the thickness of the transparent thick-film layer to be 40  $\mu\text{m}$  or greater. Huang et al., Abstract, discloses an AlGaInP light emitting diode structure with a GaP window layer

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formed to have thickness of 45  $\mu\text{m}$ . At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the GaP window layer of Shakuda et al. as thick as 40  $\mu\text{m}$ . The motivation for doing so would have been to increase the efficiency of the LED (Huang et al., Abstract). Therefore, it would have been obvious to combine Huang et al. with Shakuda et al. to obtain the invention as specified in claim 2.

***Allowable Subject Matter***

Claims 6-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No prior art discloses the claimed device where a second thick transparent window layer is formed on the second main surface side of the light emitting portion.

Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No prior art discloses the claimed method where the process-damaged layer, formed on the side face portions, are etched with an aqueous sulfuric/hydrogen peroxide solution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott R. Wilson whose telephone number is 571-272-1925. The examiner can normally be reached on M-F 8:30 - 4:30 Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

srw  
April 4, 2008

/A. Sefer/  
*Primary Examiner*  
*Art Unit 2826*